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SOUTH FLORIDA: A GEOGRAPHIC RECONNAISSANCE

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SOUTH FLORIDA: A GEOGRAPHIC RECONNAISSANCE.[1]

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There are not many places in the United States which have not been explored thoroughly and for which we do not have relatively accurate maps. This statement with certain qualifications might be made of the globe. Peary reached the North Pole in 1909. Amundsen planted the Norwegian flag at the South Pole in 1911, and Sven Hedin and other explorers have made known the geographic character of Central Asia. Although the peninsula of Florida, south of the 27th degree of north latitude, is a small portion of our national territory, yet, no two maps of that part of Florida agree in all essential geographic details. There are many districts south of Lake Ocheechobee that are terra incognita to the scientific geographer. That no accurate maps of this territory exist, notwithstanding that a number of maps of recent issue have covered this region, is due to several reasons. First, the country is one extremely difficult to penetrate, being covered by dense growths of saw grass, cypress and tropic vegetation. The cypress swamps are so far removed from the coast that the exploitation of their timber resources has not been attempted. The southwestern coast of the peninsula along Ten Thousand Islands and Whitewater Bay is a labyrinth of mangrove islands, which few white men have ever penetrated, and on a dangerous shore strewed with the wrecks of many good vessels. Second, it has been found difficult to locate by actual surveys the relative extent of the land and water areas, because these vary relatively with the seasons. During dry weather the land occupies much country which is entirely under water during the rainy seasons. A map constructed from surveys made during the dry season will show many land features which would not be shown on a map constructed from data obtained during the wet sea-

[1] This is an abstract of Professor Harshberger's trip to South Florida, taken in June, 1912, under the auspices of the Geographical Society of Philadelphia.—THE EDITORS.

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son. Third, the survey of South Florida has been delayed also in part for the reason that outside of the land itself, which is now being exploited, the country has had only three sources of wealth, namely, its timber, its fish and its game.

The country is as little known to the physiographer, the geologist, the botanist and the meteorologist as to the geographer. Observations have been made heretofore in spots only. Until recently no attempt has been made to study South Florida from a general scientific standpoint. Recently the state geological survey has been active in a study of the physiography, geology and mineral resources of the region. The Smithsonian Institution and the Bureau of Ethnology have made at times an investigation of the tribal customs and ethnic characters of the Seminole Indians. Clarence B. Moore, of Philadelphia, has made an exhaustive study of the shell mounds of Florida. Little careful study of the vegetation has been made from the geographic side, although, systematically speaking, the plants are fairly well known.

Itineraries.

With the object of investigating the problems involved in the geographic distribution of the plants the writer has made three trips to South Florida, two at his own expense and the third under the auspices of the Geographical Society of Philadelphia, in June, 1912. The first two trips were made to the east coast, as far south as Long Key. Botanic observations were made from the windows of moving trains travelling north and south and extended stops were made at St. Augustine, West Palm Beach, Delray, Miami, Princeton, Naranja, Homestead and Detroit, where plants were collected, and where geographic notes and maps were carefully made. The coastal islands and the Everglades were visited on both of these visits. In the third journey to Florida under the auspices of the Geographical Society of Philadelphia, it was planned to cover a wider territory and to supplement the botanic and geographic observations of the first trips by a visit to the west coast. While Miami was chosen as headquarters during the visits to the east coast, Ft. Myers was made headquarters for the botanic exploration of the west coast (3). Accordingly leaving Philadelphia on Saturday, June 1, 1912, Ft. Myers was reached early in the afternoon on Monday, June 3.

FIG. 1. SALT MARSH BACKED BY A THICKET OF TREES AND SHRUBS WITH TALL PALMETTOS NEAR FT. MYERS, FLA., JUNE, 1912.

FIG. 2. SOUTH BANK OF CALOOSAHATCHEE RIVER WITH TALL FERNS AND SLASH PINE, JUNE, 1912.

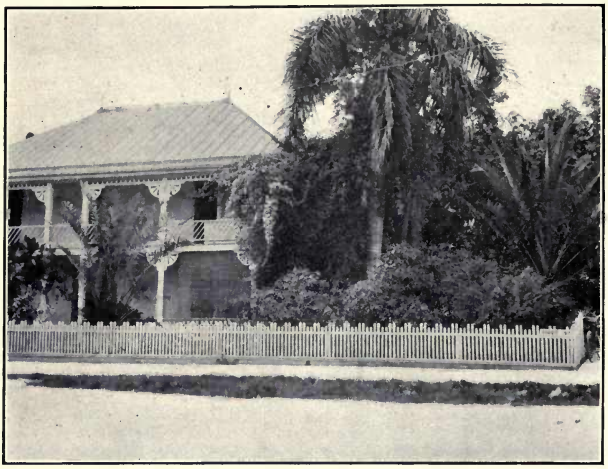

FIG. 3. ATTRACTIVE SOUTHERN HOUSE IN FT. MYERS, FLA. The royal palm is draped with purple-bracted Bougainvillea. Allamandas and Thunbergias are in the corner, June, 1912.

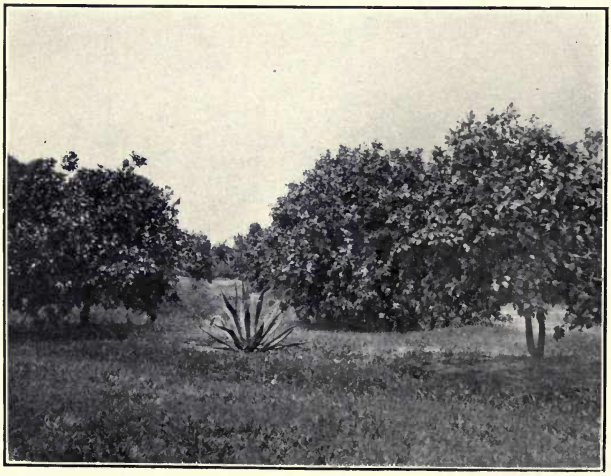

FIG. 4. ORANGE GROVE OF MR. DEAN ON SOUTH SIDE OF CALOOSAHATCHEE RIVER, ONE MILE WEST OF FT. MYERS, JUNE, 1912.

While at Ft. Myers the flora of Sanibel Island, Punta Rassa, Six Mile Cypress (south of the town in the interior), Billy's Creek and its mangrove vegetation, the pine forests and river plants were investigated. Finally leaving Ft. Myers on June 19, the mail steamer was taken to Labelle, 45 miles up the Caloosahatchee River. Owing to the torrential rains, a stop of only one day was made at Labelle, because the town was entirely under water. Proceeding from Labelle through the courtesy of the Furst-Clark Drainage Canal Construction Company, I was able to travel up the Caloosahatchee River across Lake Hicpochee and Lake Ocheechobee to the entrance of the South Canal on the south shore of Lake Ocheechobee. Photographs and detailed observations of the country and its flora were made enroute to the excellent hotel on the south shore of the lake kept by Mrs. W. F. D. King. Here, during a sojourn of several days the vegetation of the lake shore and of the nearby custard apple forest was studied. Taking the launch shown in the photograph (5) with a party of three surveyors, we proceeded across the Everglades to Ft. Lauderdale. From the entrance of the South Canal to the entrance of the North New River Canal is a distance along the south shore of Ocheechobee of about 10 miles. The North New River Canal, opened for the first time on April 25, 1912, across the Everglades, is 61 miles long. Reaching Ft. Lauderdale after a delightful trip across the Everglades, two days were spent in a visit to Key West by way of the Florida East Coast Railroad.

The Country.

South Florida may be considered to be that part of the state south of the 27th degree of north latitude. It is a country of no relief. In some places, it is perfectly flat; in other places, slightly rolling. The northern part of this territory on the east coast has ancient dunes of considerable height, that consist of silicious sand covered with spruce pine, scrub oaks, saw palmettos and rosemary. This sandy soil is exactly suited to the pineapple and, hereabouts, there are large plantations devoted to the cultivation of this fruit. South of the sandy belt the soil is rocky, owing to the exposure of oolithic limestone, which breaks into loose nodular fragments. This limestone makes the finest material for road construction and the roads, when properly built, are as hard and smooth as asphalt. The

slash pine (*Pinus caribaea*) forms unbroken forests on this land and the undergrowth consists of saw palmetto, coontie and a great variety of attractive flowering herbs and shrubs. It is an open sun-lit forest and one can see at least half a mile between the tall pine trees. The western part of South Florida along the Gulf coast has a sandy soil without any rock exposures. The beaches consist of calcareous sands which represent the remains of shells and coral polyps ground into powder by surf action. Along the rivers are large deposits of oyster shells, which are used in the surfacing of the roads in and about Ft. Myers. The central part of South Florida is entirely different physiographically from either the eastern, or the western portions. Here is found that magnificent and beautiful body of clear water, Lake Ocheechobee, which is intimately connected with the Everglades by the fact that the underground water from the lake emerges as springs through the Everglades. Appended to the southern extremity of Florida are a series of islands, or keys, connected together like a chain of pearls by the recent completion of the Florida East Coast Railroad, as far as Key West. The rivers of the east coast are short, running from the Everglades to the Atlantic across the pineland. The rivers on the west coast are either connected with the drainage system of that magnificent stream the Calloosahatchee River, which drains at least one half the State of Florida since the canals were completed between it and Lake Ocheechobee, or else the rivers arising in the cypress swamps and Everglades run a short distance toward the southwest and empty into the Gulf of Mexico. Many of these streams have never been charted and the exact length of such as the Shark and Harney rivers has never been determined. In fact some maps do not show these rivers at all. An accurate survey of this part of Florida is a great desideratum.

The Vegetation.

It is one of the characteristic features of the vegetation of South Florida that the lines of demarcation between the different floral types are so sharply drawn. For example, the boundary between a prairie and a pine forest is usually a sharp one. Hence, one can map in a fairly accurate way the different plant formations with the satisfaction that these areas are distinct and natural ones.

FIG. 5. LAUNCH *Skipjack* USED BY WRITER IN CROSSING FLORIDA EVERGLADES IN JUNE, 1912. Party of surveyors on board.

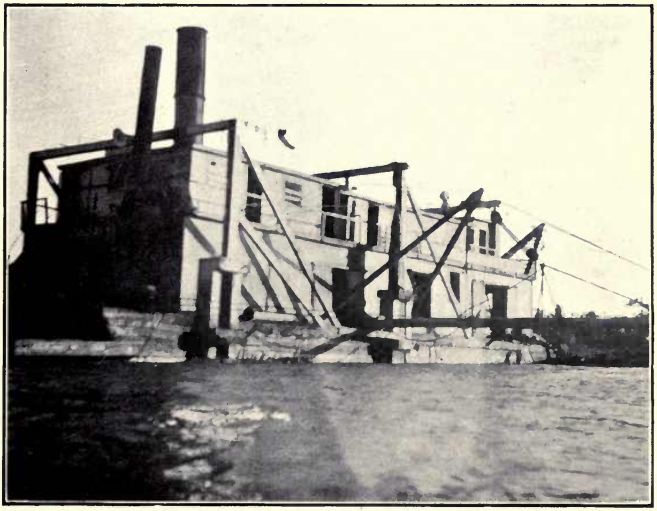

FIG. 6. LARGE STEAM DREDGE USED IN CUTTING THE DRAINAGE CANALS ACROSS THE EVERGLADES.

Not only are these areas of vegetation to be distinguished by the trained phytogeographer, but they represent tracts of the earth's surface which are recognized by the people of the region and are everyday matters of conversation with them. In a study of the vegetation of South Florida, the following types of vegetation, or plant formations, can be distinguished. In the order of interest, they are pine forest, hammock (river, palmetto, etc.), Everglades, lake vegetation, rosemary scrub, cypress swamp, prairie (coastal, saw grass, maiden cane), cypress heads, mangrove swamps, sea beach flora, sea thicket, swamp (1), river bank (2) and salt marsh formations. As the object of this paper is to give a general idea of South Florida, it will not be possible to describe these plant formations in detail. Only a few facts will be mentioned, and a complete account will be published later.

The pine forest is an open one of tall slash pines with columnar stems. The undergrowth is low and is mainly saw palmetto, coontie and a few evergreen oaks, bushes, or shrubs. Many brightly colored flowers enliven the forest throughout the year. The hammock vegetation is of the greatest luxuriousness. Here are large live oak trees festooned with Florida moss and loaded with the greatest variety of air plants, which include ferns, orchids, bromeliads and the like. The weight of these epiphytes is at times so great that the limbs of the trees are broken off like pipe stems. Many of the bromeliads resemble birds' nests in the arrangement of their leaves, which are so closely fitted together as to hold a large quantity of water. The spike of flowers with brightly colored bracts grows up a considerable distance from this rosette of leaves. The climbing vines (lianes) growing from tree to tree and the palmetto, which fills up the spaces between the live oaks, give to this type of forest a dark impenetrable look which is generally associated in the minds of the laity with a tropic forest reeking with moisture. In a visit to subtropic Florida, many of these preconceived ideas of tropic vegetation must be set aside.

The vast area of country known as the Everglades is essentially a huge saw grass swamp (5). The continuous masses of saw grass to the even horizon line are relieved only by clumps of bushes, or low trees, and by lagoons and slues filled with water lilies, spatterdock, pickerelweed, wampee, rushes, sedges and other aquatic and marsh plants. The saw grass is a tall sedge, the leaves of which

being slightly folded along the midrib give a triangular shape to a cross section of the leaf blade. The margins are roughly serrate and cut like a saw. It is a formidable sedge to travel through. The usual drainage of the Everglades is toward the southeast and this fact is taken advantage of in the location of the drainage canals which in a few years will cross the country (6). In following the recently constructed North Canal in leaving Lake Ocheechobee, the explorer passes through a low forest of custard apple trees for about 3 miles and then enters a part of the Everglades where the saw grass is so dense and the boat channels are so few that the Seminole Indians never penetrated the northern part of the glades. The boat channels, however, are found to increase in number about 30 miles south of Lake Ocheechobee. The slues and lagoons are more numerous and the islands of small trees increase in number, so that the monotonous stretches of saw grass become diversified by low trees and lagoons of open water.

The water along the whole south shore of Lake Ocheechobee is shallow and grown up to partly submerged grasses and sedges, while back of these water plants is a strip of tall grasses fronting the almost continuous border forest of custard apples. A number of wooded islands are found at the south end of the lake. These have been named Observation, Rita, Kraemer and Torry islands. They are all wooded and fringed with grasses and attractive aquatic plants. Torry Island has in addition a central prairie comprising 300 acres of open, grassy land. Some few years ago the existence of these islands was a matter of rumor and their exact location in the lake was problematic. An early homesteader took up land on Observation Island, applying to the land office at Washington for the registration of his homestead. The land office had no map that showed the location of the island, nor was there any official record of its existence. The settler did not get his title, but has continued to reside on the island. The land has passed to the State of Florida and an interesting question of law may arise, if some one else claims the land, which the pioneer has cleared and cultivated for a number of years. With the completion of the North Canal, Lake Ocheechobee has three drainage outlets: 1st, underground through the Everglades; 2d, through Three Mile Canal into Lake Hicpochee and thence to the Calloosahatchee River, and 3d, through the North Canal into the New River and the Atlantic Ocean. The lake, which is 36

FIG. 7. GROUP OF SEMINOLE INDIANS ON THE MIAMI RIVER, DECEMBER, 1910.

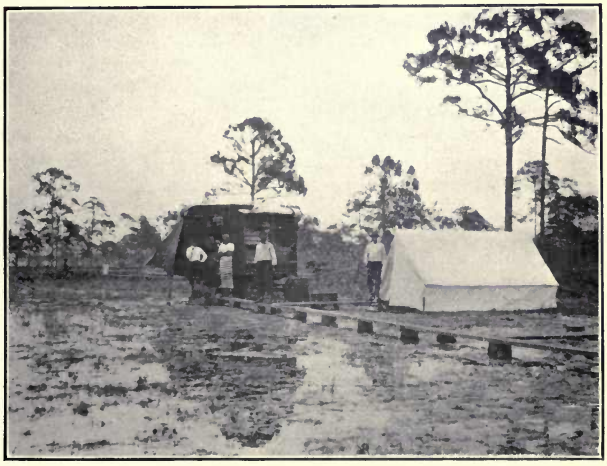

FIG. 8. CONVICT LABOR CAMP ON ROAD WEST OF FT. MYERS, JUNE, 1912.

miles long from north to south and 30 miles wide from east to west, ranges in depth from about 4 to 20 feet and with a strong wind, the troubled waters make navigation dangerous for small launches, or sailing craft.

The mangrove swamp vegetation is of geographic interest, because it is a well known fact that the mangrove tree perched in the air on long stilt-like roots is instrumental in the collection of mud, shells and debris by which the dry land areas of Florida are increased. It will be an important plant in finally fixing the embankments of the Over-Sea Railroad. The seedling is viviparous. It hangs out of the fruit until it drops to the mud below and taking root forms another tree outside of the parent one, so that the shore line is advancing slowly seaward.

The Animals of South Florida.

One thing that surprised the writer on his trip across Lake Ocheechobee and the Everglades was that there are so many alligators left in the region. Four live 'gators were seen and 3 dead ones which had been skinned by alligator hunters, and now the prey of flocks of buzzards, that are common in the country. The moccasin snake is thoroughly aquatic. One was passed at least a mile from shore in Lake Hicpochee, and a large one, as thick as the wrist, turned and hissed at the passing launch. The chameleon-like lizard (perhaps *Anolis*) is an attractive little creature, as it changes its color to suit its surroundings. Several quite large ones were seen basking on the sunny side of large forest trees. Several butterflies were seen, but they were rather scarce. I had expected to find swarms of mosquitoes in the marshy stretches of Florida, but during my trip across the Everglades, except in the evening, not one was felt. In the custard apple forest quite a few were encountered, but I cannot say that they were particularly annoying.

The bird life, however, adds great interest to a trip across Lake Ocheechobee and the Everglades. Here were seen the water turkey, that can swim with its whole body under water, the great blue heron, the white crane, the red-winged blackbird, the buzzard, several kinds of hawks, the eagle and the cormorant. My first night's sleep at the hotel on the south shore of Lake Ocheechobee was disturbed by the noises from the lake. The screech of the night

hawk, or goldback, could be distinguished above the ceaseless chorus of the frogs, some of which have piping notes, others a deep metallic, or bell-like, call. Some frogs make a cricket-like noise. Others have a deep bass tone. One species of frog made a prolonged ba-a-ap call. Amid all this din of insects, birds and frogs, the occasional grunt of an alligator could be distinguished. The glow lights of thousands of fireflies were also noted. Several kinds of turtles are caught at sea off Key West (10).

The Seminole Indian.

Reduced to 275 souls in 1908, the Seminole tribes have retired to the fastnesses of the Everglades. On the first two trips at least a dozen of them were seen with legs bare to the knees and with bright-colored clothing (7). Only one Indian was seen during the last trip to Florida and he was on the streets of Ft. Lauderdale, wearing a bright-colored shirt and a pair of ordinary trousers. President Taft has set aside recently Pine Island along the eastern border of the Everglades as an Indian reservation. This island surrounded by saw grass vegetation includes some of the finest and best drained land in the glades. An outrage against the Seminole nation was committed last December, which illustrates how the American people have treated the aborigines. DeSoto Tiger, a member of the tiger clan, was considered one of the best and most successful hunters. He had trapped otters until he had enough of skins to realize him about eight hundred and fifty dollars. On his return from Ft. Lauderdale, where the skins were sold, he was waylaid by a white man on the North Canal about 23 miles from Lake Ocheechobee, shot and relieved of all his hard-earned money. The perpetrator of this dastardly deed has never been apprehended and a sign board along the North Canal marks the spot where the Seminole met his death on December 28, 1911.

Agricultural Possibilities.

The finest kinds of citrus fruits can be raised on the sandy soils of the Caloosahatchee drainage basin (4). The rocky soils of the east coast of Florida are also well suited for the growth of grape fruits and oranges. Although it is claimed that the soil of the Everglades is adapted to the growth of these fruits, yet it is probable

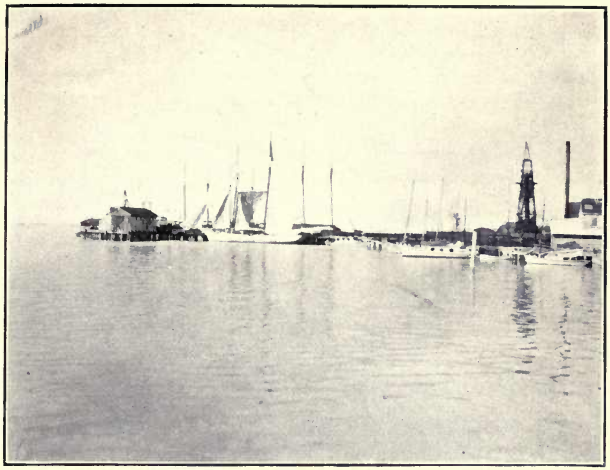

FIG. 9. HARBOR OF KEY WEST, FLA., JUNE, 1912, WITH SHIPPING.

FIG. 10. WHARF AT KEY WEST WITH GREEN, HAWK'S BILL AND LOGGERHEAD TURTLES FRESHLY CAUGHT AT SEA, JUNE, 1912.

that it will be found more profitable to grow other crops for which the soil seems better adapted. Several experimental farms have been started on Everglade soil. At Callahan's farm on the south shore of Lake Ocheechobee can be seen all kinds of plants from temperate, as well as tropic countries, the success of which in the deep black muck soil is being tried. Here are 30,000 orange trees in one nursery, seven varieties of bananas, eucalyptus, rubber trees, guava, Australian pine, strawberries, rhubarb, buckwheat, corn, grapes, Irish and sweet potatoes, peanuts and sugar cane. It is the conviction of the writer, having seen various of these plants growing in the black peat soil, that the following will probably be most successful: sugar cane, sweet potatoes, bananas, strawberries, asparagus, pumpkins and watermelons. Irish potatoes become too large and watery in the deep muck of the Everglades. Peanuts do exceptionally well. The roots of the red clover were found covered with root tubercles, indicating that perfect bacterial inoculation had taken place. Alfalfa and peanuts did not have these root tubercles, as far as the south shore plantation was concerned. All that the Everglade land needs is thorough drainage and the application of mineral fertilizers to produce big returns. In fact, the urgent need of a large part of southern Florida is a detailed and scientific drainage system. As it will be many years before such a system of drainage will be consummated, the prospective settler should be extremely careful in the selection of his land. He should be sure of two things. First, that the land is high and dry during all seasons of the year, and second, that it has reasonable fertility and is reasonably porous, to take care of the excessive rainfall, which is the rule during certain seasons of the year.

Settlement.

Many new towns have been started in South Florida within the last year, or two. On the second trip to Florida in August, 1911, the writer botanized about Detroit, a town, which, only four months old, boasted two stores, a hotel and a postoffice. This year two towns have been commenced on the shores of Lake Ocheechobee. Near the mouth of the North New River Canal, two and a half miles from the lake, is a new city which bears the name Okeelanta, a combination of Ocheechobee and Atlantic. Another city laid out on

the east shore of the lake by a land company is called Long Beach. When the extension of the Florida East Coast Railroad shall have reached the north shore of Lake Ocheechobee next year, a town will be built at the terminus and will be known as Ocheechobee. From this place, as a distributing center, all points on the lake can be reached easily by steamboats which will no doubt make regular trips to supply the settlers, who will rapidly flock into a country, which this year is one of the least known and one of the most inaccessible in all of the United States. During my stay in Florida, a regular service had just been inaugurated by boat between Ft. Lauderdale and Ft. Myers, but on account of the high water prevailing, this regular service had hardly assumed smooth running order. During the next tourist season, it will be possible to cross the state by water via the Everglades and Lake Ocheechobee.

The people, who are settling South Florida, hail from all parts of our country. They are a hardy race who will by hard labor prepare the way for those who will make of the land a garden spot of the world. The pioneers laugh at obstacles which seem almost insurmountable. No catastrophe of fire, of flood, or of storm seems too great to daunt their purpose. They are rough and uncouth in their dress and language perhaps, but they are a people worthy of our greatest admiration, for they will open up a country which is to-day a primeval wilderness. Forests are to be cleared, swamps are to be drained, carriage roads and railroads are to be built and municipalities established. The surprise is that it has taken such a short time to accomplish what has seemed an impossibility. Convict labor is used and properly in the development of roads through a country which is poor in money and poor in laboring men. Without such use, the criminal would be an additional burden on the community. The photograph taken near Ft. Myers illustrates how the convict is confined in grated vans during the night under the eyes of armed guards, who also serve as construction superintendents during the day (8).

The Over-Sea Railroad.

Next to the Panama Canal one of the greatest engineering accomplishments of recent years is the Key West extension of the Florida East Coast Railroad across the Keys to the so-called Gibraltar of

America. The product of Henry M. Flagler's constructive genius, the extension has been built against almost insuperable obstacles. No one who has not seen this railroad can form any adequate estimate of the magnitude of the labor involved. When the construction was begun there were no precedents and consequently many problems had to be solved. The great autumnal storm of 1909 put all of the construction to the severest of tests. Miles of wooden trestle were swept away, and it was decided, that instead of six miles of open water spanned by bridges there must be eighteen. Although trains have been running to Key West (9) since the opening of the railroad on Monday, January 22, 1912, much of the construction is purely of a temporary character, which is being replaced as rapidly as possible by permanent viaducts and steel bridges. There are many miles of wooden trestles across which the train slowly runs, which will be replaced by earth embankments, concrete viaducts, or steel span bridges. The mangrove will help protect the embankments from the encroachments of the sea.

It repays the traveller to ride across such wild and romantic islands made famous by the buccaneers and inhabited by the attractive conchs who make fishing and wrecking their means of livelihood. The train runs across sunlit seas where the clear water enables one to see the tropic fishes and bright colored seaweeds and coral to the best advantage from above. The next few years will see an increasing number of tourists southward bound across the keys to Cuba, Jamaica, Panama and other Central American ports, who desire to avoid the long ocean voyage and its manifest disadvantages.

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